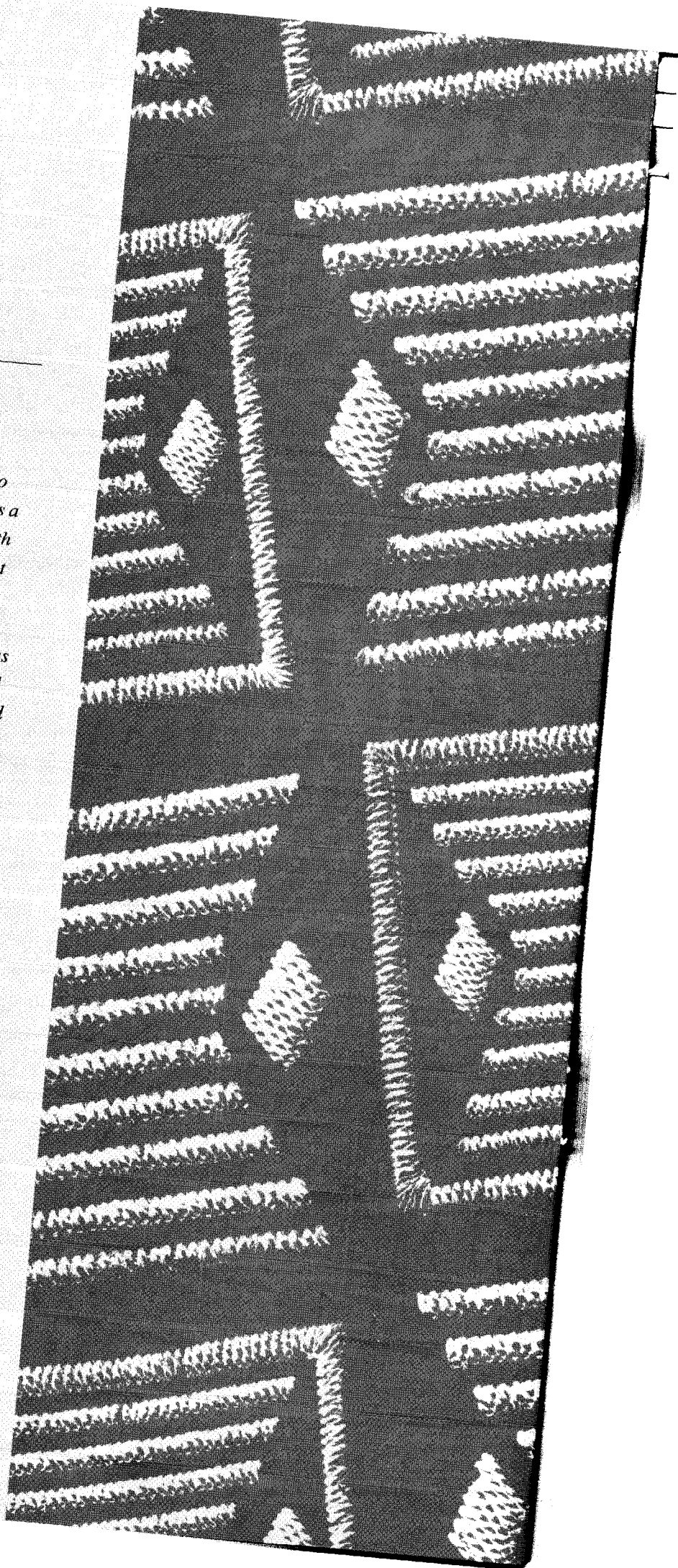


## *Foreword*

*The U.S. Agency for International Development (USAID) is committed to the encouragement of breastfeeding as a focus of its efforts to improve the health of women and children. This document summarizes the results of cost and effectiveness studies of breastfeeding activities in Latin America. It illustrates how cost-effectiveness analysis is useful for comparing alternate investments and for finding ways to improve impacts and reduce costs. The studies are particularly timely for facilitating the most efficient use of limited resources in strained national economies. We hope this work will encourage planners and program implementers to use similar approaches in the process of making public policy decisions—approaches that permit a consideration not only of the benefits of interventions but of their costs as well.*

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# Improving the Cost-Effectiveness of Breastfeeding Promotion in Maternity Services

Summary of the USAID/LAC HNS  
Study in Latin America  
(1992-1995)

*by Tina G. Sanghvi, Ph.D.*

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## INTRODUCTION

The U.S. Agency for International Development (USAID) through its Latin America and Caribbean Health and Nutrition Sustainability contract (LAC HNS), funded a study in Brazil, Honduras and Mexico during 1992-1995 to identify the current status of breastfeeding services in maternity wards of hospitals serving low income groups and to find ways of improving their cost-effectiveness.<sup>1</sup> This document summarizes the study findings and is intended for persons engaged in delivering health services, making decisions about health priorities, and researching infant feeding and health topics. Detailed technical reports on the study results are listed on the last page

of this document and are available upon request from USAID.

Breastfeeding promotion is a basic component of primary health care strategies in developed and developing countries because of the overwhelming epidemiological evidence of the protective effect of breastfeeding against childhood diseases.<sup>2</sup> However, though recognized as important, the provision of breastfeeding services is not well documented, and the literature has been weak in demonstrating program impacts, especially on exclusive breastfeeding. The costs of such interventions and their cost-effectiveness have been addressed

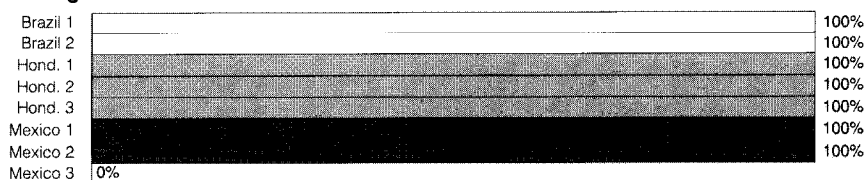
even less satisfactorily. The present study collected information from eight programs on the coverage and quality of breastfeeding promotion in pre- and postnatal clinics, delivery rooms, and postpartum wards by interviewing women at exit from maternity hospitals. The same mothers were then followed up at home to record their feeding practices. In all, over 7,500 interviews were conducted.

The study documented how well breastfeeding promotion activities are implemented and the range of impacts that can be expected from field programs that modify health facilities' practices. The study also

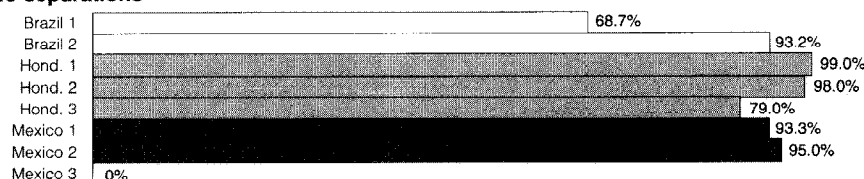


Figure 1.A: Coverage of Breastfeeding Services  
Policies and Procedures

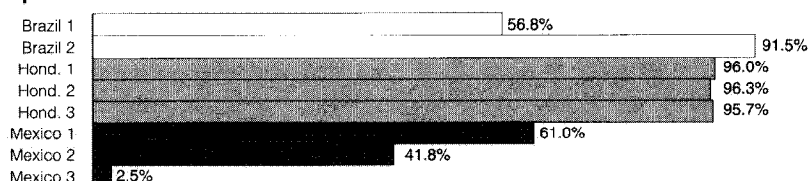
#### Rooming-in



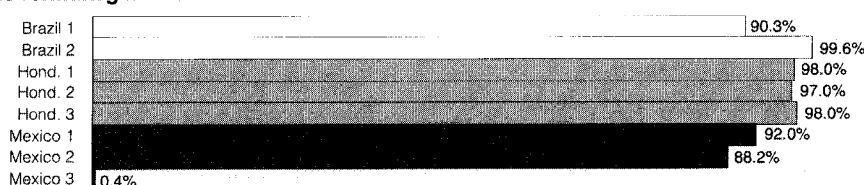
#### No separations



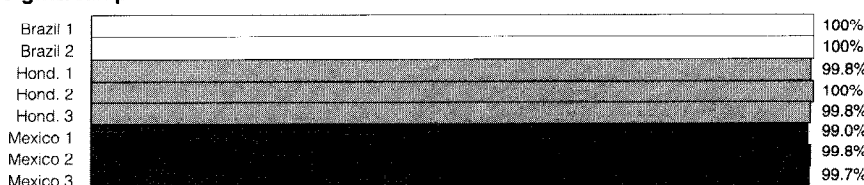
#### No prelacteals



#### No formula/glucose water



#### No gifts/samples



Brazil 1 = Comparison    Hond. 1 = Catarino Rivas    Mexico 1 = H. Mujer (rooming-in)  
Brazil 2 = Program    Hond. 2 = H. Escuela    Mexico 2 = H. General  
Hond. 3 = IHSS    Mexico 3 = H. Mujer (nursery)

## COVERAGE OF BREASTFEEDING PROMOTION

The study addressed five main areas of intervention: breastfeeding in the delivery room, formula/prelacteal feeding<sup>3</sup> and rooming-in policies, information and skills taught, education messages conveyed to mothers, and pre- and postnatal education. Though the sample of hospitals is not representative and is biased in favor of more active countries and progressive hospitals engaged in breastfeeding promotion efforts, nonetheless, we can generalize about the status of health facility services by drawing on other studies as well.<sup>4</sup>

One of the most important sets of findings relates to how well hospitals implement policy changes and activities once they decide to promote breastfeeding. Figures 1.A-1.E summarize these changes as reported by mothers. The removal of formula—a policy change that requires little investment of time but yields substantial savings—is relatively widespread (see Figure 1.A). However, this policy is not thorough in terms of completely eliminating formula use in all but exceptionally sick infants and mothers.<sup>5</sup> Fortunately,

The removal of  
formula—a policy  
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little investment  
of time but yields  
substantial savings—  
is relatively widespread.

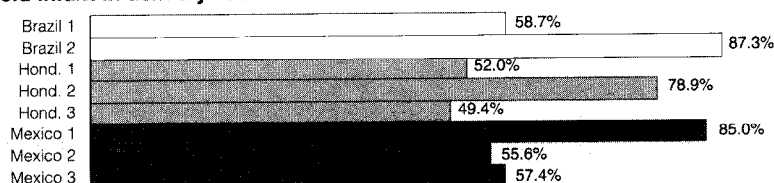
identified actions to enhance the efficiency of such programs in terms of increasing their impacts and reducing costs. In addition, the study investigated socio-economic, cognitive, and demographic variables related to breastfeeding practices—especially

maternal employment, reasons given by women for not exclusively breastfeeding, and contraceptive use. Perhaps most important, the study documented the resource implications of achieving different coverage levels and impacts, and assessed recurrent costs.

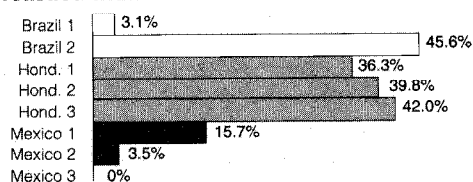


**Figure 1.B: Coverage of Breastfeeding Services**  
*Early Contact*

**Held infant in delivery room**

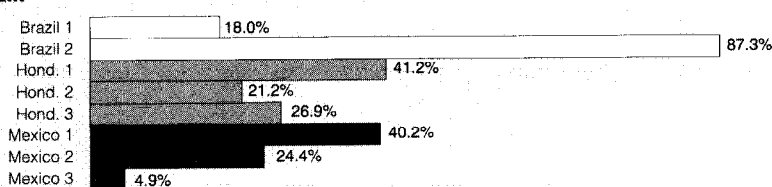


**Breastfed within 1/2 hour of birth**

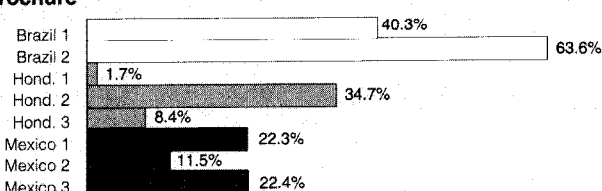


**Figure 1.C: Coverage of Breastfeeding Services**  
*Information and Skills*

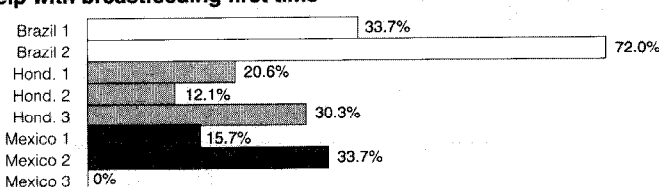
**Talk**



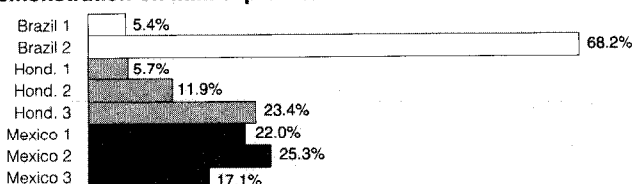
**Brochure**



**Help with breastfeeding first time**



**Demonstration on milk expression**



Brazil 1 = Comparison    Hond. 1 = Catarino Rivas    Mexico 1 = H. Mujer (rooming-in)  
 Brazil 2 = Program    Hond. 2 = H. Escuela    Mexico 2 = H. General  
                                  Hond. 3 = IHSS    Mexico 3 = H. Mujer (nursery)

once an institution adopts policies to institute rooming-in and removal of formula, routine implementation of these practices appears not to be a problem. This outcome stands in sharp contrast to other breastfeeding services. For example, nursing shortly after birth is not widely practiced (*see Figure 1.B*). Delivery of the more time- and staff-intensive education and other person-to-person activities such as teaching mothers, counseling them, and providing information is consistently low, even among well-developed programs (*see Figures 1.C, 1.D, 1.E*). Messages are either not delivered at all or poorly communicated; a high proportion of mothers responded "don't know" to questions regarding how to resolve frequently encountered breastfeeding problems. This result is worrisome as behavior change theory emphasizes the importance of "self-efficacy" or self-confidence as critical elements in positively influencing behavior.

With respect to equity, women with lower education, low-income women, and teenagers appear to be at a relative disadvantage in receiving education during pre- and postnatal checkups and during their stay in maternity wards. Mothers delivering on weekends in Honduras and Brazil were also at a disadvantage for receiving services. Current coverage rates for maternal education and counseling activities indicate that special high-risk groups (employed mothers or teenage mothers) do not receive special attention. Women from the higher socioeconomic strata receive a higher proportion of resources.

Better efforts at keeping hospital authorities informed about such discrepancies between intended policies and actual practices are urgently needed to ensure improvements. Exit interviews routinely conducted with mothers can be a low-cost, simple, and powerful monitoring tool—for individual health facilities, for state-level program monitoring, and for national assessments. Based on empirical





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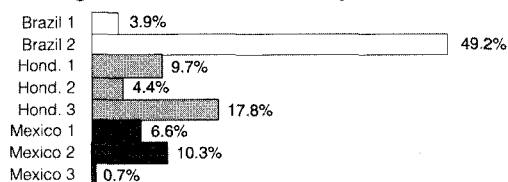
evidence of the currently low coverage of certain breastfeeding services, key monitoring indicators for universal use should include the following: whether the infant was breastfed in the delivery room or shortly after birth; whether someone helped the mother breastfeed initially; whether the mother was shown how to express breastmilk; and whether the mother was told to delay the introduction of liquids for four to six months, how to determine if breastmilk is sufficient, how to increase milk supply, and where to go for help with breastfeeding after hospital discharge.

## PROGRAM IMPACTS

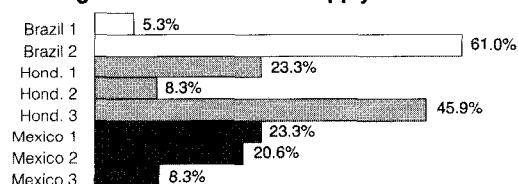
Three of the most active programs—one each in Brazil, Honduras, and Mexico—were evaluated for their program impacts by using as a comparison, a less active hospital in each location. All three programs showed evidence of an impact on breastfeeding

Figure 1.D: Coverage of Breastfeeding Services Messages

### Knowledge of whether milk is adequate



### Knowledge of how to increase supply



### Knowledge of time to introduce liquids

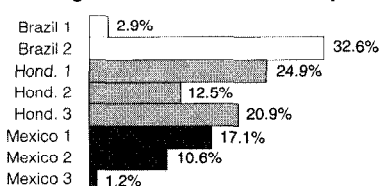
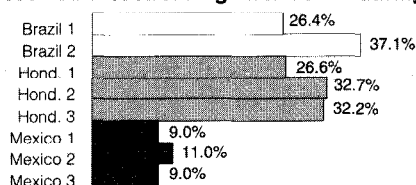
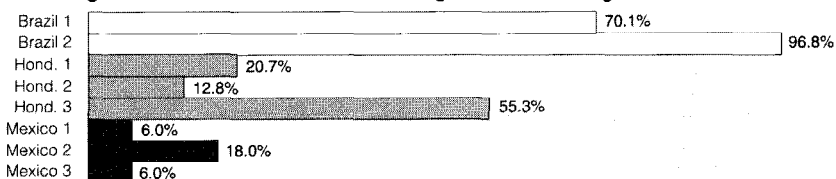


Figure 1.E: Coverage of Breastfeeding Services Pre- and Postnatal Information

### Received breastfeeding information during prenatal visits



### Counseling and information on breastfeeding received during first month



Brazil 1 = Comparison  
Brazil 2 = Program

Hond. 1 = Catarino Rivas  
Hond. 2 = H. Escuela  
Hond. 3 = IHSS

Mexico 1 = H. Mujer (rooming-in)  
Mexico 2 = H. General  
Mexico 3 = H. Mujer (nursery)

practices as summarized in Figure 2. At each age there were significantly more infants being breastfed among those born in program hospitals.

Brazil had the most highly developed program. The average duration of exclusive breastfeeding among women delivering at the program hospital in



Brazil was 53 days longer compared to women delivering at the comparison hospital (75 days versus 22 days). The main difference in program activities was maternal education and confidence-building, mainly in the postnatal period but also in prenatal clinics and maternity wards. Breastfeeding in the delivery room was also significantly more prevalent in the program hospital in Brazil. Results from all three countries support the conclusion that increasing maternal education activities will result in longer durations of exclusive and/or any breastfeeding.

## EFFICIENCY

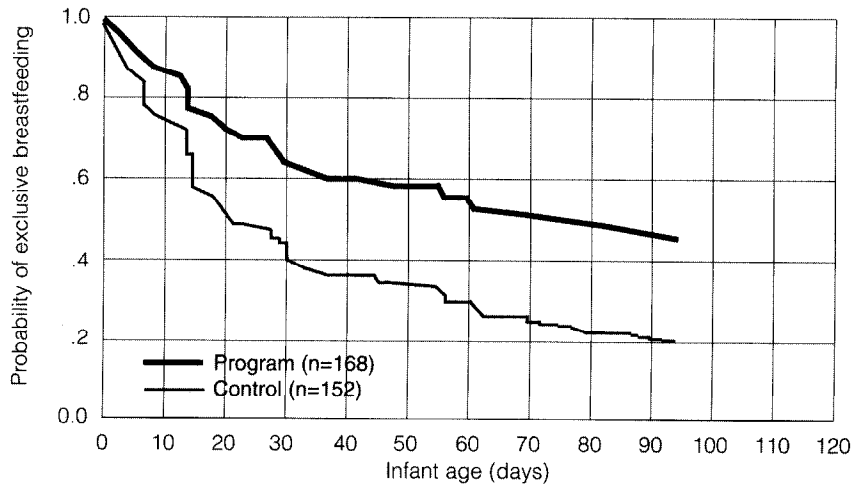
Comparisons of the costs and savings among countries and among programs within countries allowed us to explore options for improving the efficiency of programs. Differences in efficiency could be attributed to the starting point from which further improvements in breastfeeding services are being sought; the sociocultural and economic environment (e.g., type of women served, baseline breastfeeding levels, prices of substitutes and salaries); relevant hospital practices (e.g., length of stay,

number of births, proportion of Cesarean sections); and the nature of the breastfeeding intervention itself (e.g., degree of targeting, quality/motivation and cohesiveness of staff, balance of activities, supportive policy framework, choice of inputs, level of investment). The results suggest that considerable increases in savings are possible by expanding rooming-in and possibly bedding-in,<sup>6</sup> limiting the use of infant formula to very few instances, eliminating milk banks, and curtailing the use of uterine-contracting drugs.<sup>7</sup> Increases in effectiveness

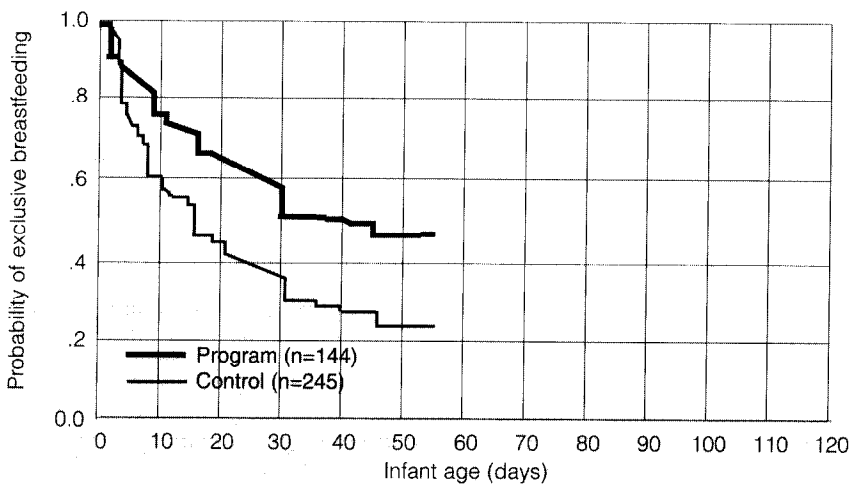


Figure 2: Effect of Breastfeeding Promotion on Breastfeeding Practices

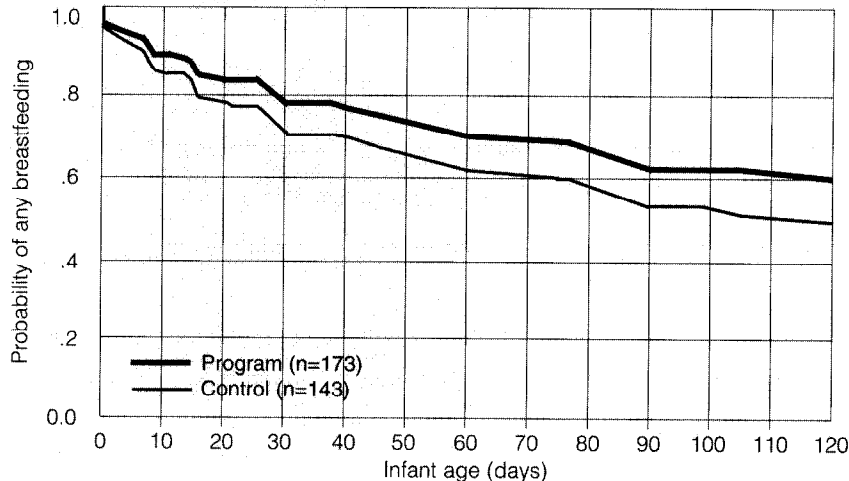
#### Brazil



#### Honduras



#### Mexico



can be expected from greater attention to the quality and scope of maternal education and support, particularly those aimed at confidence-building and teaching specific lactation management skills. Support during the postnatal period appears to be especially important for sustaining exclusive breastfeeding. The most successful hospitals in the study assigned more resources to maternal education and support through postnatal clinics held at hospitals and outreach facilities. Another distinction of the most advanced programs is their investment in training in basic medical and nursing curricula during early stages of program development, a strategy that can save individual hospitals considerable resources in in-service training.

## NEED FOR MATERNAL EDUCATION

The results show a striking discrepancy between mothers' intended or planned length of exclusive breastfeeding versus actual practices. In all countries and all hospitals, mothers' intentions called for longer duration than actual practices. It appears that women plan to breastfeed exclusively for a longer period than they do in practice. Women most often gave "insufficient milk" as the reason for early termination of exclusive breastfeeding. "Infant's crying" was the most frequently cited cue to determining insufficiency; increasing mothers' fluid intake was the most frequent solution to increasing milk supply. Both responses indicate important misconceptions.<sup>8</sup> Further, most women did not know correct responses to other common problems as well. Women report that health professionals and family members play a key role in their infant feeding choices, suggesting an important role for medical curriculum reform and broad public education.





## ROLE OF WOMEN'S EMPLOYMENT

When employed mothers return to work, their likelihood of breastfeeding falls sharply. Overall, however, the study provides encouraging evidence

that employment of mothers need not be a deterrent to reversing low levels of exclusive or any breastfeeding. As other authors have pointed out,<sup>9</sup> the proportion of mothers terminating exclusive breastfeeding is far greater than those who return to work (*see Figure 3*). The magnitude of program impacts in Brazil, where 28 percent of mothers were usually employed,

suggests that breastfeeding promotion is a worthwhile investment even if a significant proportion of the target population consists of employed women. In Brazil, less than 15 percent of women had returned to work by three months postpartum compared to Honduras (social security hospital), where over 70 percent had returned to work at two months. Brazil has



maternity leave job protection for four months compared to only six weeks in Honduras. Clearly, legislation and policies to encourage working women to delay their return to work can help protect exclusive breastfeeding.

The results reinforce previous observations that women's employment need not be a major obstacle to achieving benefits from breastfeeding promotion. Programs and policies should focus on education and counseling in the perinatal period in an effort to secure a high prevalence of exclusive breastfeeding in the first few months of life when the payoff is the greatest. The results strongly suggest a synergistic effect of public policy interventions for maternity leave legislation (to cover at least the first four to six months postpartum), strengthening the education and training of health professionals, and public education.

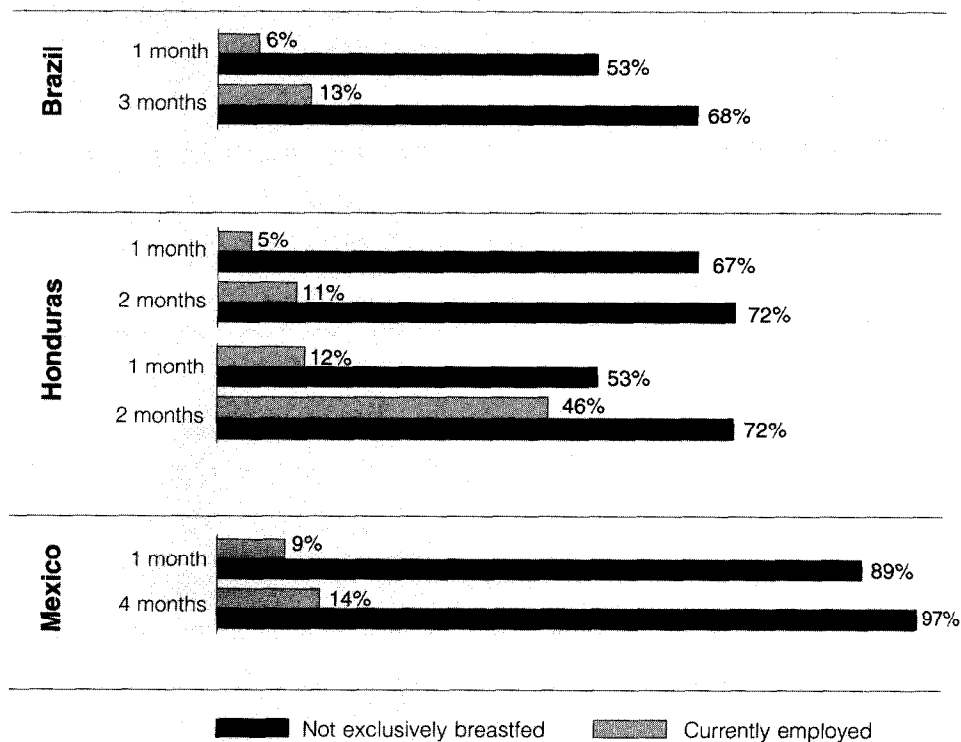
## FAMILY PLANNING AND BREASTFEEDING

Existing research indicates a potential conflict between family planning and breastfeeding promotion. To explore interactions between the two programs, the study collected data on mothers' contraceptive use. Consistent with previous research, the study found significant and negative correlations between hormonal contraceptive use and exclusive breastfeeding in all three countries (no such correlation was found for non-hormonal contraceptives). Elucidating the reasons for this negative correlation is an important topic for future policy research.

Study data on contraceptive use showed that coverage for both breastfeeding and family planning

The results strongly suggest a synergistic effect of public policy interventions for maternity leave legislation (to cover at least the first four to six months postpartum), strengthening the education and training of health professionals, and public education.

**Figure 3: Employment versus Cessation of Exclusive Breastfeeding**  
(% of women)



components need to be improved in maternity services. While 80 percent to 90 percent of all women interviewed at exit from maternity wards planned to use some method of contraception, contraceptive use at one month postpartum was only 5 percent in Honduras and 30 percent in Brazil as compared to 85 percent in Mexico. The estimated proportion of women at risk of pregnancy was 54 percent in Honduras at two months postpartum and 21 percent in Brazil at three months postpartum because the women were neither experiencing lactational amenorrhea<sup>10</sup> or exclusively breastfeeding, nor using a modern method of contraception. Perinatal counseling for protection against pregnancy may be an important missed opportunity in Brazil and especially in Honduras and should be routinely tracked as part of monitoring breastfeeding promotion activities in pre- and postnatal clinics and maternity wards. The study's findings underscore the need for activities to strengthen both contraceptive use and appropriate breastfeeding practices.



## COST-EFFECTIVENESS AND PRIORITY-SETTING

Figure 4 compares the costs and benefits of breastfeeding promotion to existing estimates for other health interventions. The results suggest that breastfeeding promotion can be one of the most cost-effective health interventions for gaining disability-adjusted life years (DALYs).<sup>11</sup> As seen in Figure 4, breastfeeding promotion costs less per DALY gained than almost any other intervention (it appears close to the uppermost sloping line), and costs lowest per intervention (it falls on the extreme right hand side of the graph). The benefits are substantial over a broad range of program types. Programs that eliminate formula feeding

and the use of medications during delivery are likely to derive a high level of impact for each dollar of investment (see BF1 in Figure 4). The cost-effectiveness is somewhat reduced (but still attractive relative to other interventions) if hospitals have already instituted rooming-in and no bottle-feeds and are investing in maternal education (see BF2 in Figure 4).

Cost-effectiveness improves as breastfeeding programs become well-established. At an annual cost of \$0.30 to \$0.40 U.S. per birth,<sup>12</sup> programs that start with eliminating formula feeding in nurseries and maternity wards can reduce diarrhea cases for approximately \$0.65 to \$1.10 per case prevented. Diarrhea deaths can be reduced for \$100 to \$200 per death averted, and the burden of disease reduced for approximately \$2 to \$4 per DALY. Maternity services that have already eliminated

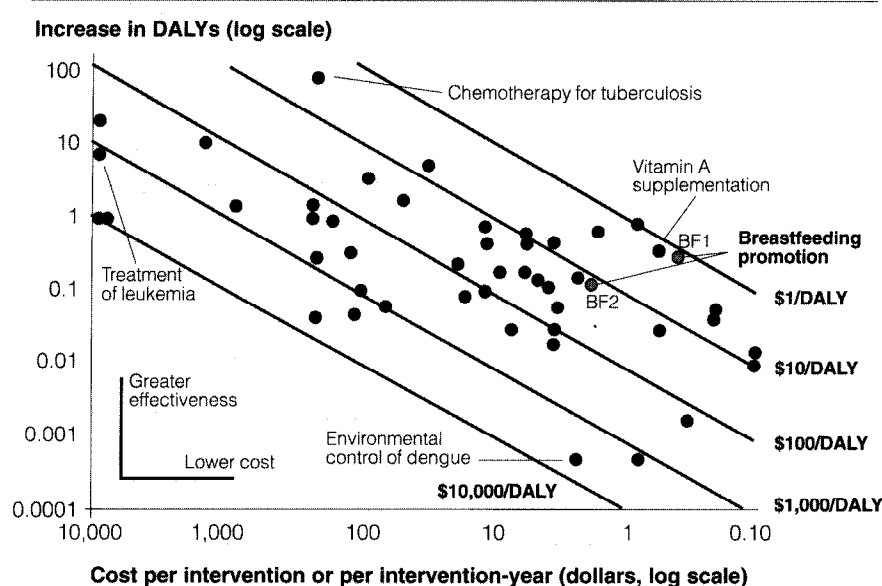
formula can, by investing primarily in maternal education activities at a level of \$2.00 to \$3.00 per birth, prevent diarrhea cases for \$3.50 to \$6.75 per case and prevent diarrhea deaths for \$550 to \$800 per death; DALYs can be gained at \$12 to \$19 each.

Past estimates of the cost of breastfeeding promotion per diarrheal episode averted and per diarrheal death averted are substantially higher than our new estimates.<sup>13</sup> Some of the difference is explained by the generous cost estimates in the previous hypothetical exercise—\$7 per birth, which is more than twice the cost per birth measured in our study. The rest of the difference is explained by the conservative assumption in the earlier study that the reduction in non-breastfeeding infants translated solely into increases in partial—but not exclusive—breastfeeding, while our study found substantial increases in exclusive breastfeeding (in Brazil and Honduras, though not in Mexico) as well as in partial or any breastfeeding (in Mexico).

Among options for diarrheal disease control, our new estimates suggest that breastfeeding promotion competes very closely with measles and rotavirus vaccination as the most cost-effective intervention (see Figure 5). This is dramatically obvious when changes in hospital routines include reduced formula feeding and medications for births coupled with their substantial savings as seen in our Mexico and Brazil (historical) results.<sup>14</sup> The same holds true after changes in hospital routines are adopted, formula use is sharply reduced, and promotion takes the form of active investment in education and support (e.g., currently in Brazil and in Honduras).

Programs that start with the removal of formula and medications during delivery are likely to derive a high level of impact per unit of net cost (due to considerable savings). Even after changes (in medical and nursing curricula, comprehensive norms and routines governing prenatal care,

Figure 4: Benefits and Costs of Health and Nutrition Interventions

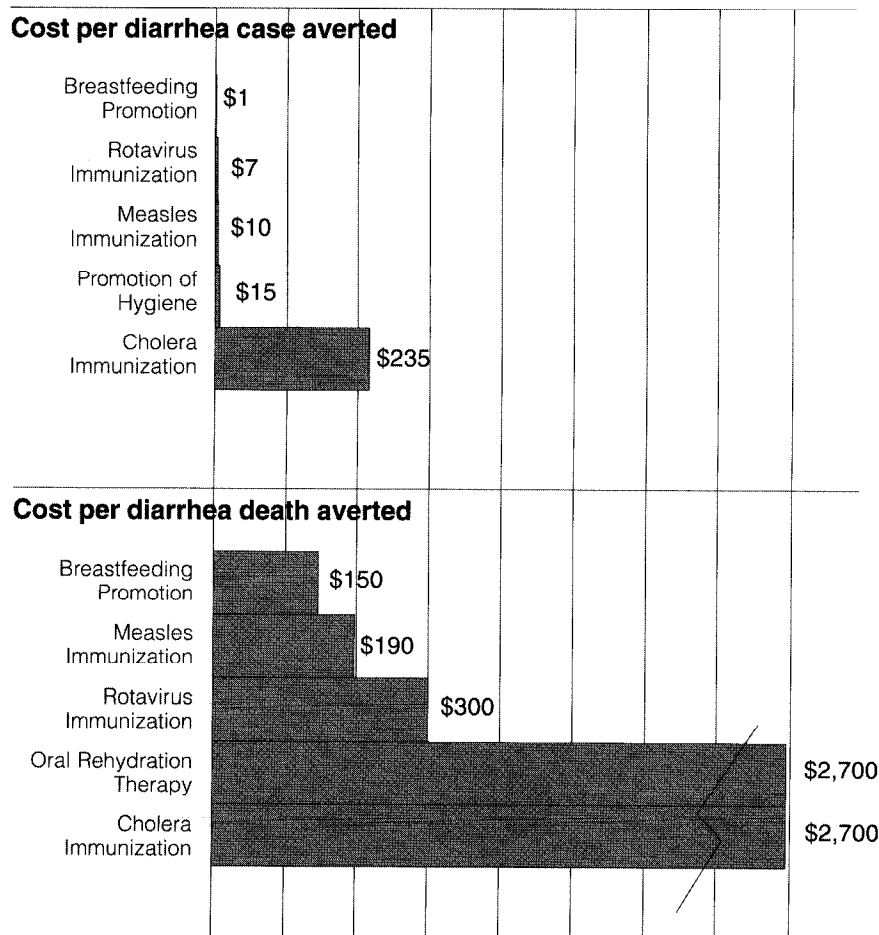


BF1 = programs moving from formula feeding to no formula + education (Brazil historical, Mexico)  
BF2 = programs investing in education and promotion after formula removal (Honduras, Brazil current)

(Adapted from the World Development Report 1993.)



**Figure 5: Comparison of the Cost-Effectiveness of Interventions for Diarrhea Control**  
(US \$, 1994)



maternity wards and postnatal clinics) have been successfully institutionalized and the recurrent costs of these activities decrease, investments in improving the quality of breastfeeding education and counseling for mothers provide a substantial payoff in improved breastfeeding practices and mortality and morbidity reduction.

This outcome is an important finding. Altering formula feeding and rooming-in practices has been an appealing option for policy makers keen on identifying savings potential in the current climate of financial constraint. Our results suggest that merely changing hospital routines for formula feeding without going the next step of

establishing comprehensive support and educational activities for mothers represents a missed opportunity to make a highly attractive health investment.

Compared to other health options, breastfeeding promotion is likely to be relatively even more attractive as a priority for expansion since, unlike immunization, for example, many areas lack in-hospital promotion programs whose initial start-up or establishment costs are not great. Furthermore, where programs already exist, coverage is still low, and the potential for expansion, before reaching the point of diminishing returns or encountering resistant pockets in the population, is considerable.

## CONCLUSIONS

The payoffs from breastfeeding investments are substantial for hospitals in terms of reduced costs of maternity care and fewer pediatric infections. Clearly, individual hospitals can take immediate steps to begin reaping these benefits. Given the need for an enabling legislative and policy context on the one hand and broader, population-wide impacts (such as fertility reduction and reduced burden on health services) on the other, the case is strong for government action as well. National-level policies and directives are needed for supporting recommended breastfeeding practices. Examples include the elimination of subsidies for infant formula, provision of maternity leave and flexible working hours for nursing women for at least four to six months after birth, adoption of stricter breastfeeding norms and routines in all public hospitals and health facilities, enhanced training in basic medical and nursing curricula, and public education campaigns.

**The payoffs from breastfeeding investments are substantial for hospitals in terms of reduced costs of maternity care and fewer pediatric infections.**



## NOTES

1. This study is part of a broader series of cost-effectiveness analyses of nutrition programs in Latin America and the Caribbean undertaken by Sanghvi et al. during 1992-1995.
2. References: Popkin BM, Adair L, Akin JS, Black R, Briscoe J, Flieger W. Breast-feeding and diarrheal morbidity. *Pediatrics*. 1990;86(6):874-880. Brown KH, Black RE, de Roma-a GL, de Kanashiro HC. Infant feeding practices and their relationship with diarrheal and other diseases in Huascar (Lima), Peru. *Pediatrics*. 1989;83(1):31-40. Victora CG, Smith PG, Vaughan JP, Nobre LC, Lombardi C, Teixeira AMB, Fuchs SMC, Moreira LB, Gigante LP, Barros FC. Evidence for protection by breast-feeding against infant deaths from infectious diseases in Brazil. *The Lancet*. 1987;2:319-321.
3. Prelacteal feeds are liquids such as formula or glucose water given to newborns before breast-feeding is initiated.
4. References: Margen S, Melnick V, Neuhauser L, Rios E. Infant feeding in Mexico: A study of health facility and mothers' practices in three regions. Nestle Infant Formula Audit Commission. 1991. Washington D.C. Popkin BM, Adair L, Akin JS, Black R, Briscoe J, Flieger W. Breast-feeding and diarrheal morbidity. *Pediatrics*. 1990;86(6):874-880. Adair LS, Popkin BM, Guilkey DK. The duration of breast-feeding: how is it affected by biological, sociodemographic, health sector, and food industry factors? *Demography*. 1993;30(1):63-80.
5. A sizeable number of facilities have not sufficiently restricted the use of formula and glucose, reduced separation of mothers from their newborns, reduced use of nurseries, and limited medication during delivery. Considerable waste and inefficiency are occurring due to unnecessary categorization of mothers and infants as needing drugs, formula and separations. In the Hospital de la Mujer in Mexico City, for example, the majority of primiparae and mothers delivering by C-sections (almost 50 percent of all births) were preferentially placed in nurseries and given formula.
6. Bedding-in refers to placing the newborns with their mothers in the same bed. This avoids the need for cots or bassinets for infants, and savings result from not having to clean and maintain these separate beds.
7. Because nipple stimulation during breastfeeding induces uterine contractions, hospitals that encourage nursing on the delivery table or immediately after birth have been able to sharply reduce the use of uterine-contracting drugs to stop hemorrhaging.
8. Correct cues for inadequate supply are infant not growing, not soiling/wetting diapers. More

frequent nursing is the correct solution to increase supply.

9. Reference: Winikoff B, Castle M, Laukaran V, eds. *Feeding Infants in Four Societies: Causes and Consequences of Mother's Choices*. Westport, Conn: Greenwood Press; 1988.
10. Lactational amenorrhea is the absence of menstrual bleeding due to breastfeeding. It is an indication of reduced fertility in breastfeeding women.
11. Disability-adjusted life years or DALYs has been proposed by the World Bank for comparing unlike health interventions because it captures all three important health effects—mortality, morbidity and disability—in a single number. Calculating DALYs requires estimates of these health impacts which are then converted into a stream of healthy years of life, with future years discounted, and each year weighted by age to reflect societal value placed on individuals of different age groups.
12. These costs refer to annual estimates of costs incurred for program maintenance, after the estimated savings from less use of formula and medications have been subtracted. This is also referred to as net costs.
13. Reference: Phillips MA, Feachem RG, Mills A. Options for diarrheal diseases control. The cost and effectiveness of selected interventions for the prevention of diarrhea. Report for WHO. London School of Hygiene and Tropical Medicine. 1987.
14. The Brazil (historical) analysis compares the costs of pre-1975 breastfeeding services at the program hospital (when 50 percent of all infants were fed formula) with current services (no formula).

## TECHNICAL REPORTS

The reports listed below can be requested from USAID at the following address:

Documents Distribution Unit  
USAID Clearinghouse  
1500 Wilson Blvd., 10th Floor  
Arlington, VA 22209.  
Phone 703-351-4006. Fax 703-351-4039.

1. Teruya K, Segall A, Baldin P, Fiedler J, Lutter C, Pérez-Escamilla R, Sanghvi T, Wickham C. Custo-Eficácia na Promoção do Aleitamento Materno em Hospitais: Estudo de Caso em Santos, Brasil
2. Rivera A, Dominguez L, Lutter C, Phillips M, Pérez-Escamilla R, Wickham C, Tercero Z, Cardona S, Flores V, Sanghvi T. Eficacia en

función de los costos de la promoción de la lactancia materna a través de los hospitales: Honduras, 1992-1993

3. Lutter C, Pérez-Escamilla R, Segall A, Sanghvi T, Teruya K, Wickham C, Fiedler J. Hospital-Based Breastfeeding Promotion Program and Exclusive Breastfeeding Among Low-Income Women in Brazil
4. Horton S, Sanghvi T, Phillips M, Pérez-Escamilla R, Lutter C, Segall A, Rivera A. Breastfeeding and Priority-Setting in Health
5. Pérez-Escamilla R, Lutter C, Wickham C, Phillips M, Treviño-Siller S, Sanghvi T. Risk Factors for Shorter Breastfeeding Duration in Mexico City Through Survival Analysis
6. Lutter C, Pérez-Escamilla R, Sanghvi T, Rivera A. Maternal Employment and Exclusive Breastfeeding: The Effect of Usual Versus Current Employment Status
7. Pérez-Escamilla R, Lutter C, Segall A, Rivera A, Sanghvi T. Determinants of Exclusive Breastfeeding in Brazil, Honduras and Mexico: A Survival Analysis Approach
8. Pérez-Escamilla R, Lutter C, Segall A, Rivera A, Sanghvi T. Breastfeeding and Family Planning in Three Urban Areas of Latin America
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